

Recent Data on Birds of Kinshasa in Democratic Republic of Congo

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Abstract: The study aimed at understanding the current avifauna characteristics, like composition, species diversity and evolution, in the city of Kinshasa. The study was conducted from 2006 to 2014, using observation, photography and Japanese nets. Results of the study indicate that there are 131 species of birds, which represents 40 families and 16 orders. Avifauna of Kinshasa represents 11% of species of the all country. Among those species, 12 are new. Passerines are the most, representing 86 species and 21 families, and are the most diversified. Few species have extended their geographical distribution and some are migratory. Overtime, avian fauna of Kinshasa region has undergone a lot of changes in its composition and diversity. Horizontal extension of the city associated with the consecutive various changes of the habitats seems to be the principal factors which modulate those characteristics. However, the study found that the majority of these species were under precarious statute of conservation.

Key words: Birds, specific diversity, Kinshasa, Democratic Republic of Congo.

1. Introduction

1.1 Goals of the Study

Birds have been the subject of several studies in the Democratic Republic of Congo (DRC), formerly called Belgian Congo and after Zaire [1-6] before his actual name. The town of Kinshasa is among localities, where various collections of data were carried out but its birds are mixed with those of the whole country.

The first study of the birds of Léopoldville (Kinshasa) was done about 50 years ago; even though it was enriched thereafter [7], only few data on the birds of Kinshasa still are available.

Kinshasa is a city that has undergone a lot changes, so was its habitat. The present study, which is a follow-up of a previous study that was conducted 13 years ago [8], intended to show specificity of the avian fauna of Kinshasa, its diversity as well as its current main characteristics.

1.2 Habitat

Kinshasa, formerly called Leopoldville, was founded in December 1881 [9] and had a population of 5,000 inhabitants in 1884, living on 115 ha with a density of 43.5 inhabitants/ha [10]. Kinshasa become the political capital of the country and acquired the status of a province. Currently, the city extends on an area of 9,984.5 km² [10]. Its population was estimated at more than 8 million inhabitants in 2010 [11] and very close to 10 million today. It is a sprawling town located in the Southwest of the country with Southern latitude 4°-5° and Eastern longitude 15°-16°30' [12]. Its climate is of tropical type AW4 according to the classification of Köppen [13].

From geomorphologic standpoint, Kinshasa presents varied aspects: plain zone with low terraces along the shores of the Congo River. However, when moving away from the Congo River, Kinshasa also presents a succession of hills from lowlands to the Bateke Plateau, which prolongs to the one of Kwango.

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Considering its area, the city covers a mosaic of habitats, with a various and diversified flora settlement which has not entirely been studied [14-19]. Downtown area is particularly occupied by fruit trees, among which mango (*Manguifera indica*), avocado (*Percea Americana*) and palm oil (*Elaeis guineensis*) are the most representative. The urban districts constitute its own field with several fruit trees, of which it is necessary to include papaya (*Carica papaya*), safoutier (*Dacryoides edulis*), red lawyer (*Syzigium cumini*), various vegetables, ornamental plants like blazing (*Deonyx regia*) and wenge (*Millettia laurentii*), hedge's plants like *Chromolaena odorata*, *Lantana camara* and *Tithonia diversifolia*, and many ruderal plants. In peripheral rural, *Panicum maximum*, *Hyparhenia* spp. and *Pennisetum purpureum* generally dominate. It has to be also noticed the presence of forest galleries and grassy mosaic formations. This entire habitat offers an environment fertile to bird's life associated or not to man's presence.

2. Materials and Methods

The authors combined direct observation of birds by the binoculars with Japanese nets capture. The authors had explored various locations, like forest, gardens, dwelling house including a vegetation able to attract birds, along the rivers, etc.. In some cases, the authors also used a Canon IXUS 4 camera and an Olympus camera for pictures. For the identification of species, many works were used [20-27]. Phylogenetic classification [28, 29] has brought many changes at the level of the orders, families, genera and species of birds. In this work, recent classification [30-32] was used.

Referring to prior data [7], it seemed that many species had changed names or systematic position or both. Thus, the authors brought up to date names of birds and their systematic positions as indicated on Table 1 before generating a general list of the known species of Kinshasa.

3. Results

3.1 Composition

Current avian fauna of Kinshasa has 16 orders, 41 families and 131 species (Table 2). Sparrows are the most with 21 families and 86 species. The majority of these species mainly live in open habitats; few are forest birds like Bulbul, few others are aquatic birds particularly Herons and the last are ubiquitous birds like Columbidae. Some pictures of those birds are in Fig. 1.

3.2 Specific Diversity

Among the above species listed, there is an unequal distribution of species between orders and families. Passerines are the most representative in diversity of species and they include 86 species which is 66% of birds. In second position, there are two orders—Piciformes and Coraciiformes. Each one of them has two families with nine species for the first and eight species for the latter, respectively. All other orders have one or two families with one or three species.

3.3 Geographical Repartition

The results contain seven species, whose presence indicate the extension of their geographical repartition. In these species, *Upupa epops* is non Passerine bird and the others are breeding birds.

3.4 Migratory Birds

Some migrating species were recorded among the birds living in or transiting by Kinshasa. In this case, there are numerous birds belonging to different orders, like Pelecaniformes as Herons, Strigiformes as *Tyto alba*, Falconiformes as *Falco tinnunculus* and Passeriformes as *Sylvia borin* and *Motacilla flava*.

3.5 Conservation

Only two species—grey parrot (*Psittachus erythacus*) and Western cattle egret (*Bubulcus ibis*) are included in the Congolese law on hunting (law No.

Table 1 Updated names of the avian.

No.	Family	Species	
		[7]*	[30-32]**
1	Phalacrocoracidae	1 <i>Phalacrocorax africanus africanus</i>	<i>Microcarbo africanus</i>
2	Ardeidae	2 <i>Pyrhroodia purpurea purpurea</i>	<i>Ardea purpurea</i>
3	Scopidae	3 <i>Scopus ombretta</i> Bannermanni	<i>Scopus umbretta</i>
4	Ciconiidae	4 <i>Ibis ibis</i>	<i>Mycteria ibis</i>
5	Rallidae	5 <i>Limnecorax flavirostris</i>	<i>Amauornis flavirostra</i>
6	Scolopacidae	6 <i>Actitis hypoleuca</i>	<i>Actitis hypoleucos</i>
7	Glareolidae	7 <i>Galachrysia nuchalis</i> Emini	<i>Glareola nuchalis</i>
		8 <i>Galachrysia cinerea</i>	<i>Glareola cinerea</i>
8	Jacaniidae	9 <i>Actophilus africanus</i>	<i>Actophilornis africanus</i>
9	Columbidae	10 <i>Vinago clava calva</i>	<i>Treron calvus</i>
10	Cuculidae	11 <i>Chrysococcyx cupeus intermedius</i>	<i>Chrysococcyx caprius</i>
11	Coraciidae	12 <i>Eurystomus afer afer</i>	<i>Eurystomus glaucurus</i>
12	Meropidae	13 <i>Melittophagus pusillus meridionalis</i>	<i>Merops pusillus</i>
		14 <i>Meropogon breweri</i>	<i>Merops breweri</i>
13	Bucerotidae	15 <i>Lophoceros fasciatus.</i>	<i>Tockus fasciatus</i>
		16 <i>Bycanistes sharpei</i>	<i>Bycanistes fistulator</i>
14	Apodidae	17 <i>Tachornis parvus brachypterus</i>	<i>Cypsiurus parvus</i>
15	Coliidae	18 <i>Colius nigricollis nigricollis</i>	<i>Colius striatus</i>
16	Picidae	19 <i>Campethera permista</i>	<i>Campethera cailliautii</i>
		20 <i>Dendropicos lafresnayi lafresnayi</i>	<i>Dendropicos fuscescens</i>
17	Sylviidae	21 <i>Sylvia borin borin</i>	<i>Sylvia borin</i>
		22 <i>Burnesia leucopogon leucopogon</i>	<i>Schistolais leucopogon</i>
18	Cisticolidae	23 <i>Cisticola natalensis</i>	<i>Cisticola natalensis</i>
		24 <i>Cisticola rufocapileata</i>	<i>Cisticola fulvicapilla</i>
		25 <i>Eremomela scotops mentalis</i>	<i>Eremomela scotops</i>
		26 <i>Bradornis murinus</i>	<i>Melaenornis pallidus</i>
19	Muscicapidae	27 <i>Cichladusa ruficauda</i>	<i>Cichladusa ruficauda</i>
		28 <i>Turdus libonyanus saturatus</i>	<i>Turdus libonyana</i>
21	Hirundinidae	29 <i>Hirundo puella unitatis</i>	<i>Cercropis abyssinica</i>
22	Malaconotidae	30 <i>Tschagra senegala rufofusca</i>	<i>Tchagra senegalus</i>
23	Laniidae	31 <i>Fiscus collaris congicus</i>	<i>Lanius collaris</i>
24	Paridae	32 <i>Parus niger leucomelas</i>	<i>Melaniparus leucomelas</i>
25	Nectariniidae	33 <i>Anthreptes collaris hypodilus</i>	<i>Hedydipna collaris</i>
		34 <i>Hyphantornis collaris</i>	<i>Ploceus cucullatus</i>
		35 <i>Melanopteryx nigerrimus</i>	<i>Ploceus nigerrimus</i>
26	Ploceidae	36 <i>Pyromelana hordacea</i>	<i>Euplectes hordeaceus</i>
		37 <i>Sitagra monacha</i>	<i>Ploceus pelzelni</i>
		38 <i>Coliuspasser macroua macroua</i>	<i>Vidua macroua</i>
27	Viduidae	39 <i>Vidua serena</i>	<i>Emberiza</i> sp.
		40 <i>Passer griseus griseus</i>	<i>Passer griseus</i>

[7]*Means names of families and species of birds were assigned by authors in Ref. [7]; [30-32]**means names of families and species of birds were assigned by authors in Refs. [30-32].

Table 2 List of current species of the birds of Kinshasa.

No.	Oder	Family	Species
1	Galliformes	1 Pasiidae	1 <i>Pternistis afer</i> (Statius Müller, 1776)
		2 Threskiornithidae	2 <i>Plegadis falcinellus</i> * (Linnaeus, 1766)
			3 <i>Ardea cinerea</i> * (Linnaeus, 1758)
2	Pelecaniformes	3 Ardeidae	4 <i>Ardea melanocephala</i> (Vigors & Children, 1826)
			5 <i>Ardea purpurea</i> (Linnaeus, 1766)
			6 <i>Bubulcus ibis</i> *** (Linnaeus, 1758)
3	Gruiformes	4 Rallidae	7 <i>Porphyrio alleni</i> (Thomson, 1842)
4	Charadriiformes	5 Chara driigae	8 <i>Charadrius hiaticula</i> (Lowe, 1915)
			9 <i>Gypohierax angolensis</i> (Gmelin, 1788)
5	Accipitriformes	6 Accipitridae	10 <i>Milvus aegyptius</i> (Gmelin, 1788)
			11 <i>Milvus migrans</i> (Boddaert, 1783)
			12 <i>Streptopelia semitorquata</i> (Ruppell, 1837)
			13 <i>Turtur afer</i> (Linné, 1766)
6	Columbiformes	7 Columbidae	14 <i>Treron calvus</i> (Temminck & Knip, 1809)
			15 <i>Turtur tympanistria</i> (Temminck, 1810)
			16 <i>Centropus senegalensis</i> (Linnaeus, 1766)
			17 <i>Ceuthmochares aerus</i> (Vieillot, 1817)
7	Cuculiformes	8 Cuculidae	18 <i>Chrysococcyx caprius</i> (Boddaert, 1783)
			19 <i>Tyto alba</i> (Fraser, 1842)
			20 <i>Bubo poensis</i> (Fraser, 1853)
8	Strigiformes	10 Strigidae	21 <i>Apus batesi</i> (Sharpe, 1904)
9	Apodiformes	11 Apodidae	22 <i>Colius striatus</i> (Gmelin, 1789)
10	Coliiformes	12 Coliidae	23 <i>Ceryle rudis</i> (Linnaeus, 1758)
			24 <i>Corythornis cristatus</i> (Pallas, 1764)
			25 <i>Halcyon albiventris</i> (Scopoli, 1868)
			26 <i>Halcyon leucocephala</i> (Müller, 1776)
			27 <i>Halcyon senegalensis</i> (Linnaeus, 1766)
			28 <i>Ispidina lecontei</i> (Cassin, 1857)
			29 <i>Ispidina picta</i> (Boddaert, 1783)
			30 <i>Merops pusillus</i> (Müller, 1776)
			31 <i>Upupa africana</i> (Bechstein, 1811)
			32 <i>Upupa epops</i> ** (Linnaeus, 1758)
11	Coraciiformes	13 Alcedinidae	33 <i>Campethera abingoni</i> (Smith, 1837)
			34 <i>Campethera cailliautii</i> (Malherbe, 1900)
			35 <i>Campethera nivosa</i> (Swainson, 1837)
			36 <i>Dendropicos fuscescens</i> (Vieillot, 1849)
12	Bucerotiformes	14 Meropidae	37 <i>Dendropicos gabonensis</i> (Verreaux, 1851)
		15 Upupidae	38 <i>Jynx ruficollis</i> (Wagler, 1830)
			39 <i>Lybius minor</i> (Cuvier, 1817)
13	Piciiformes	16 Picidae	40 <i>Pogoniulus bilineatus</i> (Sundervll, 1897)
			41 <i>Pogoniulus scolopaceus</i> (Bonaparte, 1850)
			42 <i>Falco tinnunculus</i> * (Linnaeus, 1758)
			43 <i>Agapornis pullarius</i> (Linnaeus, 1758)
14	Falconiformes	18 Falconidae	44 <i>Psittacus erithacus</i> *** (Linnaeus, 1758)
			45 <i>Poicephalus gulielmi</i> (Jardine, 1849)
15	Psittaciformes	19 Psittacidae	

(Table 2 continued)

No.	Oder	Family	Species
			46 <i>Batis minor</i> (Neuman, 1907)
		20 Platysteridae	47 <i>Batis molitor</i> (Hahn & Kuster, 1850)
			48 <i>Platysteira cyanea</i> (Müller, 1776)
		21 Malaconotidae	49 <i>Laniarius bicolor</i> (Verreaux, 1857)
			50 <i>Laniarius leucorhynchus</i> (Hartlaub, 1848)
		22 Laniidae	51 <i>Lanius collaris</i> (Linnaeus, 1758)
			52 <i>Terpsiphone batesi</i> (Chapin, 1921)
		23 Monarchidae	53 <i>Terpsiphone rufocinerea</i> (Cabanis, 1875)
			54 <i>Terpsiphone viridis</i> (Müller, 1776)
		24 Corvidae	55 <i>Corvus albus</i> (Müller, 1776)
		25 Paridae	56 <i>Melaniparus rufiventris</i> (Bocage, 1885)
			57 <i>Atimalistillas flavicollis</i> (Swainson, 1837)
			58 <i>Chlorocichla falkensteini</i> (Reichenow, 1874)
			59 <i>Chlorocichla simplex</i> (Hartlaub, 1855)
			60 <i>Criniger barbatus</i> ** (Temminck, 1821)
		26 Pycnonotidae	61 <i>Eurrillas virens</i> (Cassin, 1857)
			62 <i>Neolestes torquatus</i> (Cabanis, 1875)
			63 <i>Phyllastrephus icterinus</i> (Bonaparte, 1850)
			64 <i>Phyllastrephus scandens</i> (Swainson, 1837)
			65 <i>Pycnonotus barbatus</i> (Desfontaines, 1789)
			66 <i>Pycnonotus tricolor</i> (Desfontaines, 1789)
			67 <i>Cecropis senegalensis</i> (Linnaeus, 1766)
16	Passeriformes	27 Hirundinidae	68 <i>Hirundo rustica</i> (Linnaeus, 1758)
			69 <i>Psalidopcorne pristopectera</i> (Ruppell, 1836)
		28 Macrosphenidae	70 <i>Melocichla mentalis</i> ** (Fraser, 1843)
		29 Acrocephalidae	71 <i>Acrocephalus rufescens</i> (Sharpe & Bouvier, 1876)
			72 <i>Calamonastes undosus</i> (Reichenow, 1882)
			73 <i>Camaroptera brevicaudata</i> (Cretzschmar, 1831)
			74 <i>Cisticola brachypterus</i> (Sharpe, 1890)
		30 Cisticolidae	75 <i>Cisticola erythrops</i> (Hartlaub, 1857)
			76 <i>Eremomela icteropygialis</i> ** (Lafresnaye, 1839)
			77 <i>Prinia bairdii</i> (Cassin, 1855)
			78 <i>Prinia subflava</i> (Gmelin, 1789)
		31 Sylviidae	79 <i>Sylvia borin</i> * (Boddaert, 1783)
		32 Turdidae	80 <i>Turdus pelios</i> (Bonaparte, 1850)
			81 <i>Cercotrichas barbata</i> ** (Hartlaub & Finsch, 1870)
			82 <i>Cercotrichas hartlaubi</i> (Reichenow, 1891)
			83 <i>Cichladusa ruficauda</i> (Hartlaub, 1857)
			84 <i>Cossypha niveicapilla</i> (Lafresnaye, 1838)
		33 Muscipidae	85 <i>Melaenornis pallidus</i> (Von Müller, 1851)
			86 <i>Muscicapa comitata</i> (Cassin, 1857)
			87 <i>Myrmecocichla nigra</i> (Vieillot, 1818)
			88 <i>Oenanthe familiaris</i> (Wilkes, 1817)
			89 <i>Saxicola torquatus</i> (Linnaeus, 1758)

(Table 2 continued)

No.	Oder	Family	Species
			90 <i>Anthreptes longuemarei</i> (Lesson, 1831)
			91 <i>Chalcomitra fuliginosa</i> (Bechstein, 1811)
			92 <i>Chalcomitra senegalensis</i> (Linnaeus, 1766)
			93 <i>Cinnyris chloropygius</i> (Jardine, 1842)
		34 Nectariniidae	94 <i>Cinnyris cupreus</i> (Shaw, 1811)
			95 <i>Cinnyris venustus</i> (Shaw, 1799)
			96 <i>Cyanomitra cyanolaema</i> (Jardine & Fraser, 1851)
			97 <i>Cyanomitra olivacea</i> (Smith, 1840)
			98 <i>Cyanomitra verticalis</i> (Latham, 1790)
		35 Passeridae	99 <i>Passer griseus</i> (Vieillot, 1817)
			100 <i>Brachycope anomala</i> (Reichenow, 1887)
			101 <i>Euplectes afer</i> (Gmelin, 1789)
			102 <i>Euplectes ardens</i> (Boddaert, 1783)
			103 <i>Euplectes gierowii</i> (Cabanis, 1880)
			104 <i>Euplectes hordeaceus</i> (Linnaeus, 1758)
			105 <i>Euplectes macrourus</i> (Gmelin, 1789)
		36 Ploceidae	106 <i>Ploceus cucullatus</i> (Müller, 1776)
			107 <i>Ploceus intermedius</i> (Ruppel, 1845)
			108 <i>Ploceus nigerrimus</i> (Reichenow, 1904)
			109 <i>Ploceus nigricollis</i> (Vieillot, 1805)
			110 <i>Ploceus nigrimentus</i> (Reichenow, 1904)
			111 <i>Ploceus pelzelni</i> (Hartlaub, 1887)
			112 <i>Ploceus velatus</i> ** (Vieillot, 1819)
			113 <i>Clytospiza monteiri</i> (Hartlaub, 1860)
			114 <i>Estrilda astrild</i> (Linnaeus, 1758)
			115 <i>Estrilda melpoda</i> (Vieillot, 1817)
			116 <i>Lagonosticta rubricata</i> (Lichtenstein, 1868)
			117 <i>Pyrenestes ostrinus</i> (Vieillot, 1805)
			118 <i>Pytilia afra</i> (Gmelin, 1789)
		37 Estrildidae	119 <i>Lonchura bicolor</i> (Fraser, 1843)
			120 <i>Lonchura cucullata</i> (Swainson, 1837)
			121 <i>Lonchura fringilloides</i> (Lafresnaye, 1835)
			122 <i>Spermophaga haematina</i> (Vieillot, 1807)
			123 <i>Spermophaga ruficapilla</i> (Shelley, 1888)
			124 <i>Uraeginthus angolensis</i> (Linnaeus, 1758)
			125 <i>Uraeginthus bengalus</i> ** (Linnaeus, 1766)
		38 Viduidae	126 <i>Anomalospiza imberbis</i> (Cabanis, 1868)
			127 <i>Vidua macroura</i> (Pallas, 1764)
		39 Motacillidae	128 <i>Motacilla aguimp</i> (Dumont, 1850)
			129 <i>Motacilla flava</i> * (Linnaeus, 1758)
		40 Fringilidae	130 <i>Crithagra capistratus</i> (Finsch, 1870)
			131 <i>Crithagra mozambica</i> (Statius Müller, 1776)

*Means migrating; **means widening of the geographical distribution; ***means protected species.

82-002 of May 28, 1982). Based on this law and with respect to Washington Convention of March 03, 1973, *P. erythacus* is on list one and *B. ibis* is on list two. All others birds are subject to exploitation.

3.6 Evolution

In term of evolution, it has to be pointed out that changes occurred over time in the composition and

diversity of birds in Kinshasa. Table 3 indicates that main changes happened in two patterns. Out of 170 birds, 41 (24.12%) species are omnipresent, 39 (22.94%) species were not observed in these last years and 90 (52.94%) are new incoming birds. As we can see, half of actual birds, Passerines as well as non-Passerine of Kinshasa are mainly constituted with new species, all of which were subjected to changes.

4. Discussion

4.1 Composition and Diversity

The number of bird's species currently recorded in Kinshasa is higher than 111 species [8] previously reported. The number of birds in DRC vary with authors: 1064 [33], 1086 [22], 1099 [34], 1118 [35], 1149 [36], 1176 [37], 1180 [31], 1181 [38], 1185 [39]. According to these numbers, data from the research indicate that about 11% of the birds of DRC live in

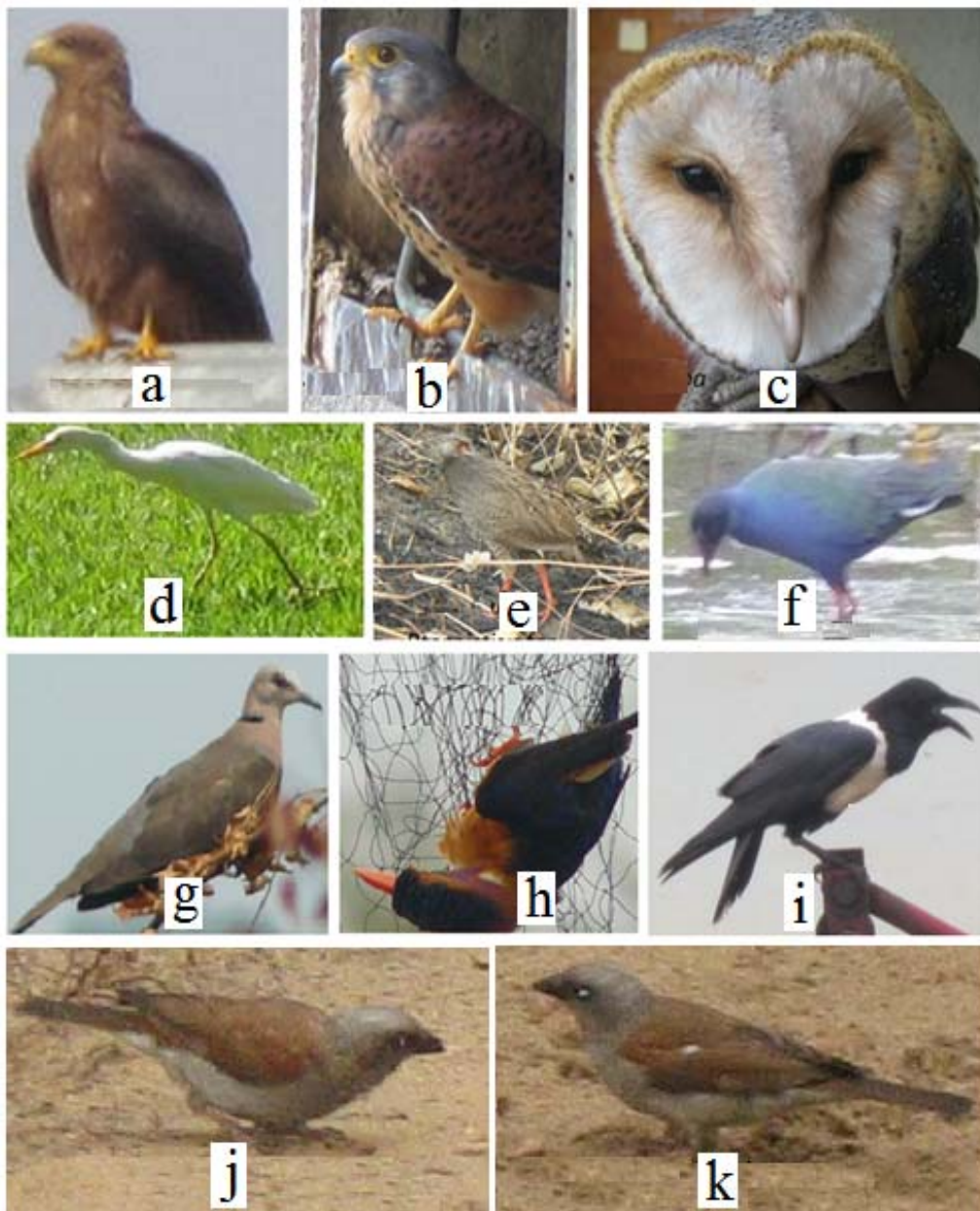




Fig. 1 Few birds of Kinshasa, Democratic Republic of Congo.

a—*Milvus aegyptius*; b—*Falco tinunculus*; c—*Tyto alba* (juvenile); d—*Bubulcus ibis*; e—*Pternistis afer*; f—*Porphyrio alleni*; g—*Streptopelia semitorquata*; h—*Ispidina picta*; i—*Corvus albus*; j—*Passer griseus*; k—*Passer griseus*; l—*Uraeginthus angolensis*; m—*Uraeginthus angolensis*; n—*Laniarius bicolor*; o—*Vidua macroura* (male); p—*Vidua macroura* (female); q—*Cichladusa ruficauda*; r—*Estrilda perreini*; s—*Halcyon senegalensis*; t—*Merops variegatus*; u—*Ploceus pelzelni*; v—*Clytospiza monteiri*; w—*Lagonostica rubricate*.

Kinshasa shelters. The authors believe that this report could be improved in the future. Among the listed species, Passerines are the most representative in diversity of species and they include 86 species which account for 66% of birds. Comparing present data with others [22], the Passerines of Kinshasa represent 14% of species of those of the whole country. In this order, only six among the 21 families recorded are well represented. In a decreasing order, they are Estrildidae, Ploceidae, Pychnonotidae, Muscipidae,

Nectarinidae and Cisticolidae. These six families together represent 61 species, i.e., 70.9% of species of the Passerines of Kinshasa.

According to the current data, none of the species known as endemic in DRC has been observed so far in Kinshasa.

4.2 Geographical Distribution

There is a difference in opinion of several authors as to geographical distribution of some species of

Table 3 Checklist of birds of Kinshasa.

No.	Species	[7]	[8]	This study
1	<i>Ardea melanocephala</i>	x	x	x
2	<i>Atimastillas flavicollis</i>	x	x	x
3	<i>Bubulcus ibis</i>	x	x	x
4	<i>Campethera cailliautii</i>	x	x	x
5	<i>Ceuthmochares aereus</i>	x	x	x
6	<i>Chrysococcyx cupreus</i>	x	x	x
7	<i>Cichladusa ruficauda</i>	x	x	x
8	<i>Cinnyris cupreus</i>	x	x	x
9	<i>Colius striatus</i>	x	x	x
10	<i>Cyanomitra verticalis</i>	x	x	x
11	<i>Dendropicos fuscescens</i>	x	x	x
12	<i>Estrilda melpoda</i>	x	x	x
13	<i>Euplectes hordeaceus</i>	x	x	x
14	<i>Eurillas virens</i>	x	x	x
15	<i>Halcyon senegalensis</i>	x	x	x
16	<i>Lanius collaris</i>	x	x	x
17	<i>Melaenornis pallidus</i>	x	x	x
18	<i>Merops pusillus</i>	x	x	x
19	<i>Milvus aegyptius</i>	x	x	x
20	<i>Neolestes torquatus</i>	x	x	x
21	<i>Passer griseus</i>	x	x	x
22	<i>Platysteira cyanea</i>	x	x	x
23	<i>Ploceus cucullatus</i>	x	x	x
24	<i>Ploceus nigerrimus</i>	x	x	x
25	<i>Ploceus pelzelni</i>	x	x	x
26	<i>Psittacus erithacus</i>	x	x	x
27	<i>Pycnonotus tricolor</i>	x	x	x
28	<i>Pyrenestes ostrinus</i>	x	x	x
29	<i>Spermestes cucullatus</i>	x	x	x
30	<i>Streptopelia semitorquata</i>	x	x	x
31	<i>Sylvia borin</i>	x	x	x
32	<i>Terpisphone rufocinerea</i>	x	x	x
33	<i>Turtur afer</i>	x	x	x
34	<i>Ardea purpurea</i>	x		x
35	<i>Centropus senegalensis</i>	x		x
36	<i>Ceryle rudis</i>	x		x
37	<i>Gypohierax angolensis</i>	x		x
38	<i>Motacilla aguimp</i>	x		x
39	<i>Myrmecocichla nigra</i>	x		x
40	<i>Treeron calvus</i>	x		x
41	<i>Vidua macroura</i>	x		x
42	<i>Actitis hypoleucos</i>	x		
43	<i>Actophilornis africanus</i>	x		
44	<i>Amaurornis flavirostra</i>	x		
45	<i>Anhinga rufa</i>	x		
46	<i>Anthreptes collaris</i>	x		
47	<i>Baeopogon indicator</i>	x		
48	<i>Butorides atricapillus</i>	x		

(Table 3 continued)

No.	Species	[7]	[8]	This study
49	<i>Bycanistes fistulator</i>	x		
50	<i>Cercropis abyssinica</i>	x		
51	<i>Cisticola fulvicapilla</i>	x		
52	<i>Cisticola lateralis</i>	x		
53	<i>Cisticola natalensis</i>	x		
54	<i>Cypsiurus parvus</i>	x		
55	<i>Dendrocygna viduata</i>	x		
56	<i>Dicrurus modestus</i>	x		
57	<i>Dryoscopus gambensis</i>	x		
58	<i>Emberiza</i> sp.	x		
59	<i>Eremomela scotops</i>	x		
60	<i>Eurystomus glaucurus</i>	x		
61	<i>Glareola cinerea</i>	x		
62	<i>Glareola nuchalis</i>	x		
63	<i>Kaupifalco monogrammicus</i>	x		
64	<i>Larus fuscus</i>	x		
65	<i>Macronyx croceus</i>	x		
66	<i>Megaceryle maxima</i>	x		
67	<i>Melaniparus leucomelas</i>	x		
68	<i>Merops breweri</i>	x		
69	<i>Merops malimbicus</i>	x		
70	<i>Microcarbo africanus</i>	x		
71	<i>Mycteria ibis</i>	x		
72	<i>Nicator chloris</i>	x		
73	<i>Pelecanus onocrotalus</i>	x		
74	<i>Pogoniulus subsulphureus</i>	x		
75	<i>Rynchops flavirostris</i>	x		
76	<i>Schistolais leucopogon</i>	x		
77	<i>Scopus umbreta</i>	x		
78	<i>Tchagra senegalus</i>	x		
79	<i>Tockus fasciatus</i>	x		
80	<i>Turdus libonyanus</i>	x		
81	<i>Acrocephalus rufescens</i>		x	x
82	<i>Agapornis pullarius</i>		x	x
83	<i>Alcedo cristata</i>		x	x
84	<i>Anomalospiza imberbis</i>		x	x
85	<i>Anthreptes longuemarei</i>		x	x
86	<i>Apus batesi</i>		x	x
87	<i>Batis minor</i>		x	x
88	<i>Batis molitor</i>		x	x
89	<i>Brachycope anomala</i>		x	x
90	<i>Camoroptera brevicaudata</i>		x	x
91	<i>Campethera abingoni</i>		x	x
92	<i>Campethera nivosa</i>		x	x
93	<i>Cercomela familiaris</i>		x	x
94	<i>Chalcomitra fuliginosa</i>		x	x
95	<i>Chalcomitra senegalensis</i>		x	x
96	<i>Charadrius hiaticula</i>		x	x

(Table 3 continued)

No.	Species	[7]	[8]	This study
97	<i>Chlorocichla falkensteini</i>		x	x
98	<i>Chlorocichla simplex</i>		x	x
99	<i>Cinnyris chloropygius</i>		x	x
100	<i>Cinnyris venustus</i>		x	x
101	<i>Cisticola brachypterus</i>		x	x
102	<i>Cisticola erythrops</i>		x	x
103	<i>Clytospiza monteiri</i>		x	x
104	<i>Corvus albus</i>		x	x
105	<i>Cossypha niveicapilla</i>		x	x
106	<i>Criniger barbatus</i>		x	x
107	<i>Crithagra capistrata</i>		x	x
108	<i>Crithagra mozambica</i>		x	x
109	<i>Cyanomitra cyanolaema</i>		x	x
110	<i>Cyanomitra olivacea</i>		x	x
111	<i>Dendropicos gabonensis</i>		x	x
112	<i>Eremomela icteropygialis</i>		x	x
113	<i>Erythropygia barbata</i>		x	x
114	<i>Erythropygia hartlaubi</i>		x	x
115	<i>Estrilda astrild</i>		x	x
116	<i>Euplectes afer</i>		x	x
117	<i>Euplectes ardens</i>		x	x
118	<i>Euplectes gierowii</i>		x	x
119	<i>Euplectes macrourus</i>		x	x
120	<i>Halcyon albiventris</i>		x	x
121	<i>Halcyon leucocephala</i>		x	x
122	<i>Hirundo rustica</i>		x	x
123	<i>Ispidina lecontei</i>		x	x
124	<i>Ispidina picta</i>		x	x
125	<i>Jynx ruficollis</i>		x	x
126	<i>Lagonosticta rubricate</i>		x	x
127	<i>Laniarius bicolor</i>		x	x
128	<i>Laniarius leucorhynchus</i>		x	x
129	<i>Lybius minor</i>		x	x
130	<i>Melocichla mentalis</i>		x	x
131	<i>Milvus migrans</i>		x	x
132	<i>Motacilla flava</i>		x	x
133	<i>Muscicapa comitata</i>		x	x
134	<i>Parus rufiventris</i>		x	x
135	<i>Phyllastrephus icterinus</i>		x	x
136	<i>Ploceus intermedius</i>		x	x
137	<i>Ploceus nigricollis</i>		x	x
138	<i>Ploceus nigrimentus</i>		x	x
139	<i>Ploceus velatus</i>		x	x
140	<i>Pogoniulus bilineatus</i>		x	x
141	<i>Pogoniulus scolopaceus</i>		x	x
142	<i>Poicephalus gulfelmi</i>		x	x
143	<i>Porphyrio alleni</i>		x	x
144	<i>Prinia subflava</i>		x	x

(Table 3 continued)

No.	Species	[7]	[8]	This study
145	<i>Pternistis afer</i>		x	x
146	<i>Pycnonotus barbatus</i>		x	x
147	<i>Pytilia afra</i>		x	x
148	<i>Spermestes bicolor</i>		x	x
149	<i>Spermestes fringilloides</i>		x	x
150	<i>Spermophaga haematina</i>		x	x
151	<i>Spermophaga ruficapilla</i>		x	x
152	<i>Turdus pelios</i>		x	x
153	<i>Turtur tympanistria</i>		x	x
154	<i>Tyto alba</i>		x	x
155	<i>Upupa africana</i>		x	x
156	<i>Upupa epops</i>		x	x
157	<i>Uraeginthus angolensis</i>		x	x
158	<i>Uraeginthus bengalus</i>		x	x
159	<i>Ardea cinerea</i>			x
160	<i>Bubo poensis</i>			x
161	<i>Calamonastes undosus</i>			x
162	<i>Cecropis senegalensis</i>			x
163	<i>Falco tinnunculus</i>			x
164	<i>Plegadis falcinellus</i>			x
165	<i>Phyllastrephus scandens</i>			x
166	<i>Prinia bairdii</i>			x
167	<i>Psalidopcorne pristoptera</i>			x
168	<i>Saxicola torquatus</i>			x
169	<i>Terpsiphone batesi</i>			x
170	<i>Terpsiphone viridis</i>			x
	Total	80	111	131

[7]: species of birds were referred to Ref. [7]; [8]: species of birds were referred to Ref. [8]; this study: species of birds were referred to this study; x: species were noted by the authors.

birds. This is the case of seven species described below. *Eremomela icteropygialis* (Cisticolidae) for example, is known only in the province of Katanga, while *Melocichla mentalis* (Macrosphenidae) exists only in the North, East and South of the country [27]. This geographical distribution of the two species could also be extended to the province of Bas-Congo [22]. Generally, *Upupa epops* (Upupidae) is a species that is largely represented in Africa, except in the forest and desert parts of the continent [22]. However, the picture used for *Upupa epops* [22] looks like an *Upupa africana* [27]. In Africa, *Upupa epops* is a Scandinavian species and its presence could be seen in the Northern part of DRC; while *Upupa africana* southerner would be inventoried in Kinshasa as well

[27]. The authors observed an individual of *Upupa africana* at the “Plateau des Residents” (a residential area of the professors of the University of Kinshasa); whereas *Upupa epops* was observed in Maluku and a specimen of the species was captured in Institut Supérieur Pédagogique (ISP) of Gombe in the middle of the city of Kinshasa. Could this be the same species or two species living together in Kinshasa? This question remains open. The geographical distribution for *Uraeginthus begalus* (Estrildidae) seems to be limited to the extreme Southern part of the country [27], or “near Kinshasa” [22]; it is one of the most common and regular species in Kinshasa. *Ploceus velatus* (Ploceidae) is a species confined in the Southern part of Africa; it is reported in the

Northwestern region of Angola [27]. In DRC, the three subspecies would be limited to the Northeastern and the Southeastern parts of the country [22]. *Criniger barbatus* (Pycnonotidae) is limited to West Africa [25, 27]. This species is located only in “large equatorial wet forest at low altitude” [22]. In the area of Kinshasa, the Bulbul was captured in gallery of local forests. The presence of *Cercotrichas hartlaubi* (Muscicapidae) is dubious in the area of Kinshasa [22, 27].

The presence of all these birds captured or observed in Kinshasa, tells us that these species have widened their geographical distribution.

4.3 Migratory Birds

Kinshasa locates on both the East Atlantic byway and the East Africa West Asia byway of migratory birds [40] and receives some Passerine and non-Passerine migrating species at times. Some species of that category must be mentioned. A crew of 10 individuals of glossy ibis (*Plegadis falcinellus*, Threskiornithidae) was observed during nearly one week in February 2010 in one of the swamps of the Ndjili River slightly at upstream of the bridge which has the same name. Several birds were observed to fly over the airport of Ndolo in West-East direction around 5:00 pm in 2011. Recently in 2013, these birds were seen to whirl above the cemetery of Kinkole at 2:00 pm, probably; they were exploring the surroundings of the Congo River, which is not far from these locations. Those species are found of aquatic habitats [22, 41]. For the garden, warblers (*Sylvia borin*, Sylviidae) were captured in the grassy zones of Kinshasa region. Herons (Ardeidae) specimens have a large member of migrating species which are regularly observed at river's bank in DRC. [22, 41-43]. The grey heron (*Ardea cinerea*, Ardeidae) belonged to the species which visited river's bank and marshy zones of the area of Kinshasa. Common kestrel (*Falco tinnunculus*, Falconidae) is known as Palearctic migratory [27]. Since 1998, some kestrel

couples are reproducing each year in building ceilings of the University of Kinshasa. One of the couples chose a broken air-conditioning in the Faculty of Sciences of University of Kinshasa as periodic nesting box, from 2008 to 2012. These examples show that the area of Kinshasa, in spite of its strong human density of 691.55 inhabitants/km² in 2005 [10], offers an environment, where some species of birds refuge or use as a temporary location. The regular presence and the reproduction of certain North species in the area of Kinshasa and perhaps also elsewhere in the country are a strong signal which supports this assertion. Do modifications of the reproductive behavior of the migratory birds be related to climate change? Furthermore, do urbanized areas be preferred site for some bird's species?

Although the fact that DRC have ratified both the Ramsar Convention of February 2, 1971 and the Bonn Convention of 1979, none migratory species observed in the town benefits from a particular legal protection.

4.4 Conservation

Current text on the conservation of wild fauna in DRC (law No. 82-002 of May 28, 1982 regulating hunting) divides the animal species into three categories as the lists of Washington Convention of March 3, 1973. According to that law, only grey parrot (*Psittacus erithacus*) appeared on the first list. On the second list, the Western cattle egret (*Bubulcus ibis*), globally owls and barn owls were found. We thus think that Western barn owl (*Tyto alba*) is included in this category. No glossy ibis (*Plegadis falcinellus*) migrating as the African sacred ibis (*Threskiornis aethiopicus*), was observed in Kinshasa, but selected on this list. All other birds' species belong to the third list (not mentioned) in DRC.

The area of Kinshasa has a hunting reserve at Bombo-Lumene. The reserve was created mainly for hunting mammals especially buffaloes (*Syncerus cafer*), and not for protecting birds which are suffering from various forms of human exploitation, without

taking into account their status of conservation.

4.5 Evolution

As we see above, the list of known birds in Kinshasa is long and comprise of 170 species (Table 3), which includes Passerines and non-Passerines. That list highlights three principal characteristics. The first category includes species, which occur in the urban environment and therefore are adapted to the human presence for several years. Forty-one species belong to this category (Table 3: from No. 1 to No. 41). Among those species, most are species of open habitats, like savanna and urban places. However, it was observed that the presence of species was also frequently seen in aquatic environments like *Ardea melanocephala* and in forest habitats like *Dendropicos fuscescens*. The second category includes species which previously were recorded in Kinshasa, but not observed these last years. They represent half of the species (Table 3: from No. 42 to No. 80). Those species show the same ecological characteristics as those of the first category. They are mentioned that *Anhinga rufa*, *Larus fuscus*, *Mycteria ibis*, *Pelecanus onocrotalus* and *Scopus umbreta* for aquatic species and *Bycanistes fistulator* and *Tockus fasciatus* for the forest species. On one hand, the presence of the lesser black-backed gull (*Larus fuscus*) informs us that formerly Malebo Pool has less human presence than it is today, until attracting species to live in coastal zone of the marine environments. On the other hand, the absence of the pied crow (*Corvus albus*), in the past, omnipresent specie currently in downtown, indicates the degree of degradation of the urban environmental quality of Kinshasa. The third category consists of 90 species (Table 3: from No. 81 to No. 170). In general, the group contains species whose habitats are of similar types of those of the other categories, and in fact Passerines are the most numerous. These facts agree with the idea that birds are good indicators of the state and the health of an ecosystem [44-47]. That situation can be also explained by urban expansion in

zones where grassy savannas are the dominant formations of vegetation, as in Maluku, Nsele and the Plateau of Bateke which constitute the peripheral zones of Kinshasa. Let us note that the two municipalities—Maluku and Nsele, are qualified “urbano-rural municipalities” and extend on an area representing 85.8% of the entire city of Kinshasa [10]. Their vegetation is mainly characterized by a mosaic of savannas, and is favorable habitats for Passerines of open areas. This vegetation is not occurring in the central part of the city. It is the case for the majority of those species. Thus, it is not a new colonization of the urban environment but a consequence related to urban expansion. This enlargement of the town includes new species of birds formerly wild and later forced to cohabit with men.

5. Conclusions

Avian fauna of Kinshasa, Democratic Republic of Congo, is rich in number of species and diversity. In actual habitats, this fauna contain species of various ecological statutes. These facts can be due to the lateral extension of town which includes main wild areas.

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